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### (54) **SYSTEM AND METHOD FOR PACKAGING VISCOELASTIC MATERIALS**

ANORDNUNG UND VERFAHREN ZUM VERPACKEN VON VISKOELASTISCHEN STOFFEN

SYSTEME ET PROCEDE D'EMBALLAGE DE MATERIAUX VISCOELASTIQUES

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**EP 1 003 680 B1**

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## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

**[0001]** This invention relates to stacked loads of viscoelastic materials in film packages. More particularly, this invention relates to a palletized load and a method of creating a palletized load of stacked film packages containing viscoelastic materials.

#### Background of the Invention

**[0002]** Transporting and storing goods on pallets is well known. Various systems and methods have been disclosed for packaging goods on a pallet. In particular, U.S. Patent 5,353,936 to Dockstader et al. ("Dockstader") discloses a protective tray and a method for loading packages of material (such as bags of salt, small rocks or stones, dirt, sugar or fertilizer) on a pallet so as to prevent them from shifting laterally when subjected to a lateral force, according to the preamble of claims 1 and 8. The method requires placing a low-friction sheet on the upper surfaces of a pallet. Then a protective fiberboard tray is placed on the sheet and packages of material are stacked in the tray. Finally, a stretch-type plastic wrap is wrapped around the stacked packages so that the lower edge of the wrap overlies the outer periphery of the protective tray but does not overlie the periphery of the pallet.

**[0003]** The shifting problem addressed by Dockstader is just one of the obstacles to be overcome when shipping and storing viscoelastic materials. Viscoelastic materials such as polychloroprene polymers flow under conditions of high stress or high temperatures as a result of a phenomenon called "cold flow." Viscoelastic materials lacking crystalline domains such as polychloroprene copolymers made with dichlorobutadiene comonomers, are particularly prone to cold flow.

**[0004]** Generally, viscoelastic materials are packaged as chips or pellets which are covered with anti-massing partitioning agents in order to prevent the particulates from massing during shipment and storage. Cold flow exposes new polymer surfaces which in the final packaged materials are not covered with anti-massing partitioning agents and thus can result in massed materials. When the viscoelastic material is a polychloroprene polymer, cold flow couples with the unique property of auto-adhesion possessed by such polymers to cause the material to amass in the package.

**[0005]** In the past, cold flow of viscoelastic materials has been inhibited during shipping and storage by packaging the materials in relatively inelastic and stiff packages such as multiwalled paper shipping sacks. These packages are stacked on a pallet and shipped. After the contents are emptied, the packages are disposed of by incinerating, land-filling or recycling.

**[0006]** More recently, attention has been focused on developing more environment-friendly packages. One approach is to make packages from materials that can be consumed in the processing operations to which the package contents are subjected after shipment and/or storage. An example of such packages are the film packages described by Flieger in WIPO Patent Publication WO 93/17067. These packages can be used for shipping and storing melt-processable materials then consumed in the melt-processing operation with the materials contained therein. Unfortunately, while environmentally advantageous, these packages do not adequately inhibit cold flow of melt-processable, viscoelastic materials when used to ship and store such materials on a pallet.

**[0007]** When cold flow is not restricted, stacked bags of the viscoelastic material overflow the sides of the pallets on which they are stacked and compromise efficient shipping and/or storage. This phenomenon is illustrated in Figures 2 and 3 wherein bags 11 of viscoelastic material are stacked on pallet 13. After a period of about 48 hours, cold flow is manifested by pushing the outer edges of bags 11 substantially laterally beyond the periphery of pallet 13. In Figure 2, the lowermost bags in the stack overhang and sag about the top support, the side supports and side openings of the pallet making it difficult to insert the forklift tines without damaging or shifting some of the bags. In Figure 3, the material has flowed to one side, pushing the bags over the edge of the pallet. The material cannot be transported in this condition. The pallet must be reloaded.

**[0008]** Applicant has found that existing methods including the Dockstader method for shipping and storing particulate goods do not adequately inhibit cold flow of viscoelastic materials packed in film bags. Accordingly, a need exists for a reliable, environment-friendly system and method for transporting and storing viscoelastic materials on a pallet.

### SUMMARY OF THE INVENTION

**[0009]** In a first aspect, the invention provides a palletized load system for a viscoelastic material comprising:

- a pallet (13) comprising a generally horizontal top support (13a) having an upwardly facing surface and two generally vertical side supports (13b) disposed at opposite ends of the top support and extending downward from the top support (13a);
- a tray (12) disposed on the upwardly facing surface of the pallet (13) and comprising a bottom panel substantially equal in area to said upwardly facing pallet surface;
- a load (10) supported on said tray (12) so as not to extend laterally substantially beyond the outer periphery of the top support (13a) of said pallet (13), said load (10) comprising a plurality of packages

(11) stacked in layers; and  
 an outer wrap (14) extending about the periphery of  
 said tray (12) and load (10), and at least partially  
 overlapping the uppermost stacked packages (11);

characterized in that said load comprises a plurality of  
 polymeric, melt-processable, film packages (11) which  
 contain a viscoelastic material, said wrap (14) overlies  
 and extends down said side supports (13b) of the pallet  
 at least one inch (2.54 cm) from the edge of the upwardly  
 facing surface of the pallet (13) top, and said outer wrap  
 (14) is pleated and the pleats (14b) are substantially  
 aligned with the mid-section of each package layer.

**[0010]** In a second aspect, the invention provides a  
 method of creating a palletized load (10) of packaged  
 viscoelastic material on a pallet (13) comprising a gen-  
 erally horizontal top support (13a) having an upwardly  
 facing surface and generally vertical side supports (13b)  
 disposed at opposite ends of the top support (13a) and  
 extending downward from and supporting the top sup-  
 port (13a), said method comprising the steps of:

placing a tray (12) on the upwardly facing surface of  
 the pallet (13), said tray (12) comprising a bottom  
 panel substantially equal in area to said upwardly  
 facing pallet (13) surface;  
 placing a plurality of film packages on said tray (12)  
 in stacked layers so as not to extend laterally sub-  
 stantially beyond the outer periphery of the top sup-  
 port (13a) of said pallet (13); and  
 applying an outer wrap (14) circumferentially about  
 the tray (12) and the stacked packages (11) such  
 that an upper edge of the wrap (14) at least par-  
 tially overlaps the uppermost stacked packages  
 (11);

characterised in that the packages are polymeric, melt-  
 processable, film packages (11) which contain a visco-  
 elastic material, the outer wrap overlies and extends  
 down said side supports (13b) of the pallet (13) to a point  
 at least one inch (2.54 cm) from the edge of the upwardly  
 facing surface of the pallet (13) top, and the outer wrap  
 is pleated and the pleats (14b) are substantially aligned  
 with the mid-section of each package layer.

#### BRIEF DESCRIPTION OF THE DRAWINGS

##### **[0011]**

Figure 1 is a side view of a palletized load of the  
 invention.

Figure 2 is a side view of ethylene copolymer pack-  
 ages of viscoelastic material stacked on a pallet  
 wherein the viscoelastic material has undergone  
 cold flow to create a problem of the type overcome  
 by the present invention.

Figure 3 is a side view of ethylene copolymer pack-  
 ages of viscoelastic material stacked on a pallet  
 wherein the viscoelastic material has undergone  
 cold flow to create a second problem of the type  
 overcome by the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0012]** Figure 1 depicts a preferred embodiment of the  
 palletized load of the invention. The pallet 13 includes  
 a top support 13a which can be a single piece or a plu-  
 rality of parallel spaced slats. The top support is con-  
 ventionally made of suitable strength wood and is fixed  
 at opposite ends, as by nailing or stapling, in transverse  
 relation to side supports 13b. One or more additional  
 runners or stringers, such as the one indicated at 13c,  
 can be fixed to the top support. The side supports and  
 runners or stringers are also conventionally made of  
 wood. A double-sided reversible pallet can be provided  
 by including a bottom support 13d, comprising a single  
 piece or a plurality of parallel spaced slats, fixed in trans-  
 verse relation to the side supports opposite top support  
 13a. The top support 13a and bottom support 13d are  
 spaced apart and supported by the side supports 13b  
 and any additional runners or stringers 13c. This spac-  
 ing creates openings 13e which facilitate entry of the  
 fork tines of a forklift type vehicle to facilitate handling  
 of the loaded pallet. The side supports 13b and any run-  
 ners or stringers 13c are also formed to facilitate entry  
 and lifting of the pallet by a forklift.

**[0013]** Alternative pallet embodiments can be used in  
 the invention. In one such preferred alternative, the side  
 supports and stringer comprise a top board affixed to at  
 least two, and preferably three, blocks. The blocks are  
 positioned at each end of the top board and, if there are  
 three blocks, at the mid-section of the top board. For  
 stability and to facilitate stacking, a bottom board or a  
 plurality of bottom boards may be affixed to the end of  
 the blocks opposite the top boards. This alternative pal-  
 let embodiment allows the tines of a forklift to enter and  
 lift the pallet from any of four directions.

**[0014]** In assembling the palletized load 10 depicted  
 in Figure 1, a tray 12 is placed on the upper surface of  
 the upwardly facing top support 13a. The tray comprises  
 a bottom panel substantially equal in area to the upwardly  
 facing pallet surface. In the preferred embodiment de-  
 picted in Figure 1, tray 12 further comprises upwardly  
 curved side and end panels secured to an outer rectan-  
 gular periphery of the bottom panel. Selection of the ap-  
 propriate tray will depend on the degree of cold flow that  
 the viscoelastic material will undergo. Factors affecting  
 cold flow primarily include: the amount of crystalline do-  
 mains in the viscoelastic material, the viscosity of the  
 viscoelastic material, and storage and shipping temper-  
 atures. More cold flow occurs as the amount of crystal-  
 line domains decreases, viscosity decreases and/or  
 shipping or storage temperatures increase. When less  
 cold flow occurs, a substantially flat, bottom panel, com-

prised of cardboard or plastic, can be used. When more cold flow occurs, the preferred embodiment with its upwardly curved side and end panels should be used. The curved side and end panels help to contain the bottom layer of packages 11a and, with the outer wrap 14, prevents the bottom layer 11a from flowing over the edge of the pallet 13. The preferred tray 12 is stiff and durable, and may be constructed of wood, cardboard, plastic or a laminate comprising a wooden core between paper outer layers. The stiffness helps maintain the position of the bottom package layer 11a. The durability allows the tray to be reused. Preferably, tray 12 is a SKEE™ slip sheet, made of a hardwood veneer center core bonded between moisture resistant kraft paper, by Elberta Crate & Box Company, Dundee, Illinois.

**[0015]** After tray 12 is positioned on pallet 13, packages of viscoelastic material such as bags 11 of material such as polychloroprene polymer, chlorosulfonated polyethylene elastomers, ethylene elastomers, fluoroelastomers, nitrile rubber, hydrogenated nitrile rubber or natural rubber, usually in the form of chips or pellets, are stacked in layers on the tray 12 such as shown in Figure 1. The bags are made of a polymeric film which is compatible with subsequent melt-processing operations for the viscoelastic material. Generally, such melt-processing operations are conducted at temperatures of 80 - 120 °C. Preferably bags 11 are made of a film comprising ethylene copolymers. Alternately preferred bags derived from ethylene vinyl acetate containing 18-28% vinyl acetate and having primary melting point below the temperature of the melt process can be used. The ethylene vinyl acetate resins may be co-extruded with a thin film of ethylene vinyl acetate resins of higher melting points to facilitate opening of the bags during the polymer packaging process. A third preferred material for the construction of the film for making a bag are polyolefins such as Affinity VP-8770, ethylene octene copolymers (The Dow Chemical Company, Midland, Michigan, USA). Polymers of particular interest in this application are those having 1.0 melt index, 0.9 g/cc density and less than 85 °C melting temperatures.

**[0016]** Most preferably, bags 11 comprise a film package as disclosed in WIPO Patent Publication WO 93/17067, particularly a package comprising a film of an ethylene copolymer containing 55-90 % by weight ethylene and 15-45% by weight of an unsaturated monocarboxylic acid having 3-8 carbon atoms which is neutralized from 0-40% by at least one metal ion selected from lithium, sodium, magnesium and zinc.

**[0017]** An adhesive may optionally be applied to the outer surface of bags 11 to help hold the bags in place relative to each other. Suitable adhesives have a relatively high shear strength so the bags will not slide relative to one another, a low tensile strength so the bags are easily lifted off the low layer, and are chemically compatible with the bags and the viscoelastic materials in the bags. Examples of suitable adhesives include Loc'n Pop Loxit P<sub>1</sub> (Key Tech, Mukilteo, Washington,

USA), Film Grip 33-4044 (National Starch, Bridgewater, New Jersey, USA) and BAM480 (Beardow & Adams, Milton Keynes, England) a hot melt adhesive containing EVA copolymer, synthetic and natural resins and anti-oxidants. Usually a small amount of adhesive, on the order of 0.2-1.0 grams per 55 pound (25 kg) bag of viscoelastic material, is used.

**[0018]** After tray 12 and bags 11 are positioned on pallet 13, an outer wrap 14 is applied circumferentially about the pallet 13, the tray 12 and the stacked bags 11 such that wrap overlies and extends down pallet side supports 13b to a point at least one inch (2.54 cm) from the edge of the upwardly facing surface of pallet top 13a and overlies the upwardly curved side and end panels of tray 12, and an upper edge 14a of the wrap at least partially overlaps the uppermost stacked packages. Applying outer wrap 14 such that it overlies and extends down side supports 13b anchors bags 11 and tray 12 in place on pallet 13. Preferably outer wrap 14 extends around pallet 13 to a point 2-3 inches (5.1-7.6 cm) down side supports 13b as shown in Figure 1. In this preferred embodiment, outer wrap 14 is applied over openings 13e in the pallet. To lift and move the palletized load 10, fork tines of a forklift are inserted into openings 13e, piercing the section of outer wrap 14 overlying said openings. The intact sections of outer wrap 14 in combination with the pleats in the outer wrap, described below, are sufficient to anchor the load in place on pallet 13.

**[0019]** Preferably outer wrap 14 comprises a polyolefin stretchwrap. More preferably it is Point Guard, PI3520135, polyolefin stretchwrap (Reynolds Metals Company, Flexible Packaging Division, Appleton, Wisconsin, USA). The stretchwrap should be pre-stretched to 100-200% elongation before it is applied.

**[0020]** Additionally, at least one band of pleats should be formed lengthwise in the wrap. The pleats can be formed using a conventional stretch wrapping machine equipped with a pleating mechanism. The outer wrap is applied such that the pleats are aligned with package layer as shown in Figure 1 wherein pleats 14b align with bag layer 11b and pleats 14c align with bag layer 11c. Therefore, the preferred number of pleat bands will depend upon the width of the wrap and the approximate distance between midsections of the bag layers being wrapped. Pleating the wrap and aligning the pleats with the mid-section of each bag layer impart strength to the packaging system and help restrict cold-flow.

**[0021]** It will thus be appreciated that the palletized load system and method of the present invention provides a stable packaging system for shipping and storing viscoelastic materials with minimal waste disposal requirements. The film packages can be consumed in subsequent viscoelastic material processing operations and the tray can be re-used. Cold flow of the viscoelastic material and its attendant problems are inhibited.

## Claims

1. A palletized load system for a viscoelastic material comprising:

a pallet (13) comprising a generally horizontal top support (13a) having an upwardly facing surface and two generally vertical side supports (13b) disposed at opposite ends of the top support and extending downward from the top support (13a);  
 a tray (12) disposed on the upwardly facing surface of the pallet (13) and comprising a bottom panel substantially equal in area to said upwardly facing pallet surface;  
 a load (10) supported on said tray (12) so as not to extend laterally substantially beyond the outer periphery of the top support (13a) of said pallet (13), said load (10) comprising a plurality of packages (11) stacked in layers; and  
 an outer wrap (14) extending about the periphery of said tray (12) and load (10), and at least partially overlapping the uppermost stacked packages (11);

**characterized in that** said load comprises a plurality of polymeric, melt-processable, film packages (11) which contain a viscoelastic material, said wrap (14) overlies and extends down said side supports (13b) of the pallet at least one inch (2.54 cm) from the edge of the upwardly facing surface of the pallet (13) top, and said outer wrap (14) is pleated and the pleats (14b) are substantially aligned with the mid-section of each package layer.

2. The palletized load system of claim 1 wherein the tray (12) further comprises upwardly curved side and end panels secured to an outer rectangular periphery of the bottom panel and the outer wrap (14) overlies said upwardly curved side and end panels of the tray (12).  
 3. The palletized load system of claim 2 wherein the tray (12) comprises a material selected from wood, cardboard, plastic, and a laminate comprising a wooden core and a paper outer layer on opposite sides of the wooden core.  
 4. The palletized load system of claim 1 wherein the viscoelastic material comprises a polychloroprene polymer.  
 5. The palletized load system of claim 1 wherein the melt-processable ethylene copolymer package (11) comprises a film of an containing 55-90 % by weight ethylene and 15-45% by weight of an unsaturated monocarboxylic acid having 3-8 carbon atoms which is neutralized from 0-40% by at least one met-

al ion selected from lithium, sodium, magnesium and zinc.

6. The palletized load system of claim 1 further comprising an adhesive at least one point between the layers of stacked packages (11).  
 7. The palletized load system of claim 1 wherein the outer wrap (14) overlies and extends down the side supports (13b) of the pallet (13) to a point about 2-3 inches (5.1-7.6 cm) from the edge of the upwardly facing surface of the pallet (13) top.  
 8. A method of creating a palletized load of packaged viscoelastic material on a pallet (13) comprising a generally horizontal top support (13a) having an upwardly facing surface and generally vertical side supports (13b) disposed at opposite ends of the top support (13a) and extending downward from and supporting the top support (13a), said method comprising the steps of:

placing a tray (12) on the upwardly facing surface of the pallet (13), said tray (12) comprising a bottom panel substantially equal in area to said upwardly facing pallet (13) surface;  
 placing a plurality of film packages on said tray (12) in stacked layers so as not to extend laterally substantially beyond the outer periphery of the top support (13a) of said pallet (13); and  
 applying an outer wrap (14) circumferentially about the tray (12) and the stacked packages (11) such that an upper edge of the wrap (14) at least partially overlaps the uppermost stacked packages (11);

**characterised in that** the packages are polymeric, melt-processable, film packages (11) which contain a viscoelastic material, the outer wrap overlies and extends down said side supports (13b) of the pallet (13) to a point at least one inch (2.54 cm) from the edge of the upwardly facing surface of the pallet (13) top, and the outer wrap is pleated and the pleats (14b) are substantially aligned with the mid-section of each package layer.

9. The method of claim 8 wherein the tray (12) further comprises upwardly curved side and end panels secured to an outer rectangular periphery of the bottom panel and the outer wrap (14) overlies the upwardly curved side and end panels of the tray (12).  
 10. The method of claim 9 wherein the tray (12) comprises a material selected from wood, cardboard, plastic, and a laminate comprising a wooden core and a paper outer layer on opposite sides of the wooden core.

11. The method of claim 8 wherein the viscoelastic material comprises a polychloroprene polymer.
12. The method of claim 8 wherein the melt-processable package comprises a film of an ethylene copolymer containing 55-90 % by weight ethylene and 15-45% by weight of an unsaturated monocarboxylic acid having 3-8 carbon atoms which is neutralized from 0-40% by at least one metal ion selected from lithium, sodium, magnesium and zinc.
13. The method of claim 8 further comprising the step of applying an adhesive to at least one point on a surface of at least one package layer such that the adhesive bonds the package layer to the underlying tray (12) or package layer or to the overlying package layer.
14. The method of claim 8 wherein the outer wrap (14) overlies and extends down the side supports (13b) of the pallet (13) to a point about 2-3 inches (5.1-7.6 cm) from edge of the upwardly facing surface of the pallet top (13a).

#### Patentansprüche

1. Palettiertes Lastsystem für ein viskoelastisches Material, das aufweist:

eine Palette (13), die eine im allgemeinen horizontale obere Auflage (13a) mit einer nach oben liegenden Fläche und zwei im allgemeinen vertikale Seitenauflagen (13b) aufweist, die an gegenüberliegenden Enden der oberen Auflage angeordnet sind und sich von der oberen Auflage (13a) aus nach unten erstrecken; eine Mulde (12), die auf der nach oben liegenden Fläche der Palette (13) angeordnet ist und eine Bodenplatte aufweist, die im wesentlichen eine gleiche Fläche wie die nach oben liegende Palettenfläche zeigt;

eine Last (10), die in der Mulde (12) getragen wird, so daß sie sich nicht seitlich im wesentlichen über den äußeren Umfang der oberen Auflage (13a) der Palette (13) hinaus erstreckt, wobei die Last (10) eine Vielzahl von Packungen (11) aufweist, die in Schichten gestapelt sind; und

eine äußere Hülle (14), die sich um den Umfang der Mulde (12) und der Last (10) herum erstreckt und mindestens teilweise die obersten gestapelten Pakkungen (11) überlappt;

**dadurch gekennzeichnet, daß** die Last eine Vielzahl von polymeren, in der Schmelze verarbeitbaren Folienpackungen (11) aufweist, die ein viskoelastisches Material enthalten, die Hülle (14)

über den Seitenauflagen (13b) der Palette liegt und sich nach unten um mindestens 1 in. (2,54 cm) vom Rand der nach oben liegenden Fläche der Oberseite der Palette (13) erstreckt, und die äußere Hülle (14) gefaltet wird, und die Falten (14b) im wesentlichen mit dem Mittelabschnitt einer jeden Packungsschicht ausgerichtet sind.

2. Palettiertes Lastsystem nach Anspruch 1, bei dem die Mulde (12) außerdem eine nach oben gebogene Seite und Endplatten aufweist, die an einem äußeren rechteckigen Umfang der Bodenplatte gesichert sind, und bei dem die äußere Hülle (14) über der nach oben gebogenen Seite und den Endplatten der Mulde (12) liegt.

3. Palettiertes Lastsystem nach Anspruch 2, bei dem die Mulde (12) ein Material aufweist, das aus Holz, Karton, Kunststoff und einem Laminat ausgewählt wird, das einen Holzkern und eine äußere Schicht aus Papier auf den gegenüberliegenden Seiten des Holzkernes aufweist.

4. Palettiertes Lastsystem nach Anspruch 1, bei dem das viskoelastische Material ein Polychlorprenpolymer aufweist.

5. Palettiertes Lastsystem nach Anspruch 1, bei dem die in der Schmelze verarbeitbare Ethylencopolymerpackung (11) eine Folie eines Ethylencopolymers aufweist, das 55 bis 90 Gew.-% Ethylen und 15 bis 45 Gew.-% einer ungesättigten Monocarbonsäure mit 3 bis 8 Kohlenstoffatomen enthält, die von 0 bis 40 % durch mindestens ein Metallion neutralisiert wird, das unter Lithium, Natrium, Magnesium und Zink ausgewählt wird.

6. Palettiertes Lastsystem nach Anspruch 1, das außerdem einen Klebstoff an mindestens einer Stelle zwischen den Schichten der gestapelten Packungen (11) aufweist.

7. Palettiertes Lastsystem nach Anspruch 1, bei dem die äußere Hülle (14) über den Seitenauflagen (13b) der Palette (13) liegt und sich dort nach unten bis zu einer Stelle etwa 2 bis 3 in. (5,1 bis 7,6 cm) vom Rand der nach oben liegenden Fläche der Oberseite der Palette (13) erstreckt.

8. Verfahren für das Erstellen einer palettierten Last aus abgepacktem viskoelastischem Material auf einer Palette (13), die eine im allgemeinen horizontale obere Auflage (13a) mit einer nach oben liegenden Fläche und im allgemeinen vertikale Seitenauflagen (13b) aufweist, die an gegenüberliegenden Enden der oberen Auflage (13a) angeordnet sind und sich von der oberen Auflage (13a) aus nach unten erstrecken und diese tragen, wobei das Verfah-

ren die folgenden Schritte aufweist:

Anordnen einer Mulde (12) auf der nach oben liegenden Fläche der Palette (13), wobei die Mulde (12) eine Bodenplatte aufweist, die im wesentlichen eine gleiche Fläche wie die nach oben liegende Fläche der Palette (13) zeigt; Anordnen einer Vielzahl von Folienpackungen auf der Mulde (12) in gestapelten Schichten, so daß sie sich nicht seitlich im wesentlichen über den äußeren Umfang der oberen Auflage (13a) der Palette (13) hinaus erstrecken; und Aufbringen einer äußeren Hülle (14) peripher um die Mulde (12) und die gestapelten Packungen (11), so daß ein oberer Rand der Hülle (14) mindestens teilweise die obersten gestapelten Packungen (11) überlappt;

**dadurch gekennzeichnet, daß** die Packungen polymere, in der Schmelze verarbeitbare Folienpackungen (11) sind, die ein viskoelastisches Material enthalten, die äußere Hülle über den Seitenauflagen (13b) der Palette (13) liegt und sich nach unten bis zu einer Stelle mindestens 1 in. (2,54 cm) vom Rand der nach oben liegenden Fläche der Oberseite der Palette (13) erstreckt, und die äußere Hülle gefaltet wird, und die Falten (14b) im wesentlichen mit dem Mittelabschnitt einer jeden Packungsschicht ausgerichtet sind.

9. Verfahren nach Anspruch 8, bei dem die Mulde (12) außerdem eine nach oben gebogene Seite und Endplatten aufweist, die an einem äußeren rechteckigen Umfang der Bodenplatte gesichert sind, und bei dem die äußere Hülle (14) über der nach oben gebogenen Seite und den Endplatten der Mulde (12) liegt.

10. Verfahren nach Anspruch 9, bei dem die Mulde (12) ein Material aufweist, das aus Holz, Karton, Kunststoff und einem Laminat ausgewählt wird, das einen Holzkern und eine äußere Schicht aus Papier auf den gegenüberliegenden Seiten des Holzkernes aufweist.

11. Verfahren nach Anspruch 8, bei dem das viskoelastische Material ein Polychlorprenpolymer aufweist.

12. Verfahren nach Anspruch 8, bei dem die in der Schmelze verarbeitbare Ethylencopolymerpackung eine Folie eines Ethylencopolymers aufweist, das 55 bis 90 Gew.-% Ethylen und 15 bis 45 Gew.-% einer ungesättigten Monocarbonsäure mit 3 bis 8 Kohlenstoffatomen enthält, die von 0 bis 40 % durch mindestens ein Metallion neutralisiert wird, das unter Lithium, Natrium, Magnesium und Zink ausgewählt wird.

13. Verfahren nach Anspruch 8, das außerdem den Schritt des Aufbringens eines Klebstoffes auf mindestens eine Stelle auf einer Fläche von mindestens einer Packungsschicht aufweist, so daß der Klebstoff die Packungsschicht mit der darunterliegenden Mulde (12) oder Packungsschicht oder mit der darüberliegenden Packungsschicht verbindet.

14. Verfahren nach Anspruch 8, bei dem die äußere Hülle (14) über den Seitenauflagen (13b) der Palette (13) liegt und sich dort nach unten bis zu einer Stelle etwa 2 bis 3 in. (5,1 bis 7,6 cm) vom Rand der nach oben liegenden Fläche der Oberseite (13a) der Palette erstreckt.

## Revendications

1. Système de chargement sur palette pour un matériau visco-élastique, comprenant :

une palette (13) comprenant un support supérieur (13a) généralement horizontal pourvu d'une surface dirigée vers le haut et deux supports latéraux (13b) généralement verticaux situés aux extrémités opposées du support supérieur et s'étendant vers le bas depuis le support supérieur (13a);

un plateau (12) disposé sur la surface de la palette (13) dirigée vers le haut et comprenant un panneau de fond de superficie sensiblement égale à ladite surface de la palette dirigée vers le haut ;

une charge (10) supportée sur ledit plateau (12) de manière à ne pas s'étendre, sur les côtés, substantiellement au-delà de la périphérie extérieure du support supérieur (13a) de ladite palette (13), ladite charge (10) comprenant une pluralité d'emballages (11) empilés en couches ; et

une enveloppe extérieure (14) s'étendant autour de la périphérie dudit plateau (12) et de ladite charge (10) et recouvrant, au moins partiellement, les emballages (11) situés sur le dessus de la pile ;

**caractérisé par le fait que** ladite charge comprend une pluralité d'emballages (11) formés d'une feuille polymère pouvant être traitée par fusion qui contiennent un matériau visco-élastique, que ladite enveloppe (14) couvre lesdits supports latéraux (13b) de la palette et s'étend vers le bas sur au moins un pouce (2,54 cm) de ceux-ci à partir du bord de la surface, dirigée vers le haut, du dessus de la palette (13), et que ladite enveloppe extérieure (14) est plissée et les plis (14b) sont sensiblement alignés avec la section moyenne de chaque couche d'emballages.

2. Système de chargement sur palette selon la revendication 1, dans lequel le plateau (12) comprend, en outre, des panneaux latéraux et d'extrémité incurvés vers le haut fixés sur un contour rectangulaire extérieur du panneau de fond et l'enveloppe extérieure (14) couvre lesdits panneaux latéraux et d'extrémité du plateau (12) incurvés vers le haut. 5
3. Système de chargement sur palette selon la revendication 2, dans lequel le plateau (12) comprend un matériau sélectionné entre le bois, le carton, le plastique, et un stratifié comprenant un noyau en bois et une couche extérieure en papier sur les côtés opposés du noyau en bois. 10
4. Système de chargement sur palette selon la revendication 1, dans lequel le matériau visco-élastique comprend un polymère de polychloroprène. 15
5. Système de chargement sur palette selon la revendication 1, dans lequel l'emballage (11) en copolymère d'éthylène pouvant être traité par fusion comprend une feuille faite d'un copolymère d'éthylène contenant 55-90% en poids d'éthylène et 15-45% en poids d'un acide monocarboxylique non saturé possédant 3-8 atomes de carbone qui est neutralisé à partir de 0-40% par au moins un ion métallique sélectionné parmi le lithium, le sodium, le magnésium et le zinc. 20 25
6. Système de chargement sur palette selon la revendication 1, comprenant, en outre, un adhésif en au moins un point entre les couches d'emballages (11) empilés. 30
7. Système de chargement sur palette selon la revendication 1, dans lequel l'enveloppe extérieure (14) couvre les supports latéraux (13b) de la palette (13) et s'étend vers le bas sur ceux-ci jusqu'à un point situé à environ 2-3 pouces (5,1-7,6 cm) du bord de la surface, dirigée vers le haut, du dessus de la palette (13). 35 40
8. Procédé pour créer un chargement sur palette de matériau visco-élastique emballé, sur une palette (13) comprenant un support supérieur (13a) généralement horizontal pourvu d'une surface dirigée vers le haut et deux supports latéraux (13b) généralement verticaux situés aux extrémités opposées du support supérieur (13a) et s'étendant vers le bas depuis le support supérieur (13a) en le supportant, ledit procédé comprenant les étapes qui consistent à : 45 50
 

placer un plateau (12) sur la surface de la palette (13) dirigée vers le haut, ledit plateau (12) comprenant un panneau de fond de superficie sensiblement égale à ladite surface de la palet-

te (13) dirigée vers le haut ;

placer sur ledit plateau (12) une pluralité d'emballages formés d'une feuille empilés en couches de manière à ne pas s'étendre, sur les côtés, substantiellement au-delà de la périphérie extérieure du support supérieur (13a) de ladite palette (13) ; et

appliquer une enveloppe extérieure (14) entourant la circonférence du plateau (12) et des emballages empilés (11), de manière à ce qu'un bord supérieur de l'enveloppe (14) recouvre au moins partiellement les emballages (11) situés sur le dessus de la pile ;

**caractérisé par le fait que** les emballages sont des emballages (11) formés d'une feuille polymère pouvant être traitée par fusion qui contiennent un matériau visco-élastique, que l'enveloppe extérieure couvre lesdits supports latéraux (13b) de la palette (13) et s'étend vers le bas sur ceux-ci jusqu'à un point situé à au moins un pouce (2,54 cm) du bord de la surface, dirigée vers le haut, du dessus de la palette (13), et que l'enveloppe extérieure est plissée et les plis (14b) sont sensiblement alignés avec la section moyenne de chaque couche d'emballages.

9. Procédé selon la revendication 8, dans lequel le plateau (12) comprend, en outre, des panneaux latéraux et d'extrémité incurvés vers le haut fixés sur un contour rectangulaire extérieur du panneau de fond et l'enveloppe extérieure (14) couvre les panneaux latéraux et d'extrémité du plateau (12) incurvés vers le haut. 35
10. Procédé selon la revendication 9, dans lequel le plateau (12) comprend un matériau sélectionné entre le bois, le carton et le plastique, et un stratifié comprenant un noyau en bois et une couche extérieure en papier sur les côtés opposés du noyau en bois. 40
11. Procédé selon la revendication 8, dans lequel le matériau visco-élastique comprend un polymère de polychloroprène. 45
12. Procédé selon la revendication 8, dans lequel l'emballage en copolymère d'éthylène pouvant être traité par fusion comprend une feuille faite d'un copolymère d'éthylène contenant 55-90% en poids d'éthylène et 15-45% en poids d'un acide monocarboxylique non saturé possédant 3-8 atomes de carbone qui est neutralisé à partir de 0-40% par au moins un ion métallique sélectionné parmi le lithium, le sodium, le magnésium et le zinc. 50 55

13. Procédé selon la revendication 8, comprenant, en outre, l'étape consistant à appliquer un adhésif sur au moins un point sur une surface d'au moins une couche d'emballages, de manière à ce que l'adhésif relie la couche d'emballages au plateau (12) ou à la couche d'emballages sous-jacent/e ou à la couche d'emballages sus-jacente. 5
14. Procédé selon la revendication 8, dans lequel l'enveloppe extérieure (14) couvre les supports latéraux (13b) de la palette (13) et s'étend vers le bas sur ceux-ci jusqu'à un point situé à environ 2-3 pouces (5,1-7,6 cm) du bord de la surface, dirigée vers le haut, du dessus (13a) de la palette. 10

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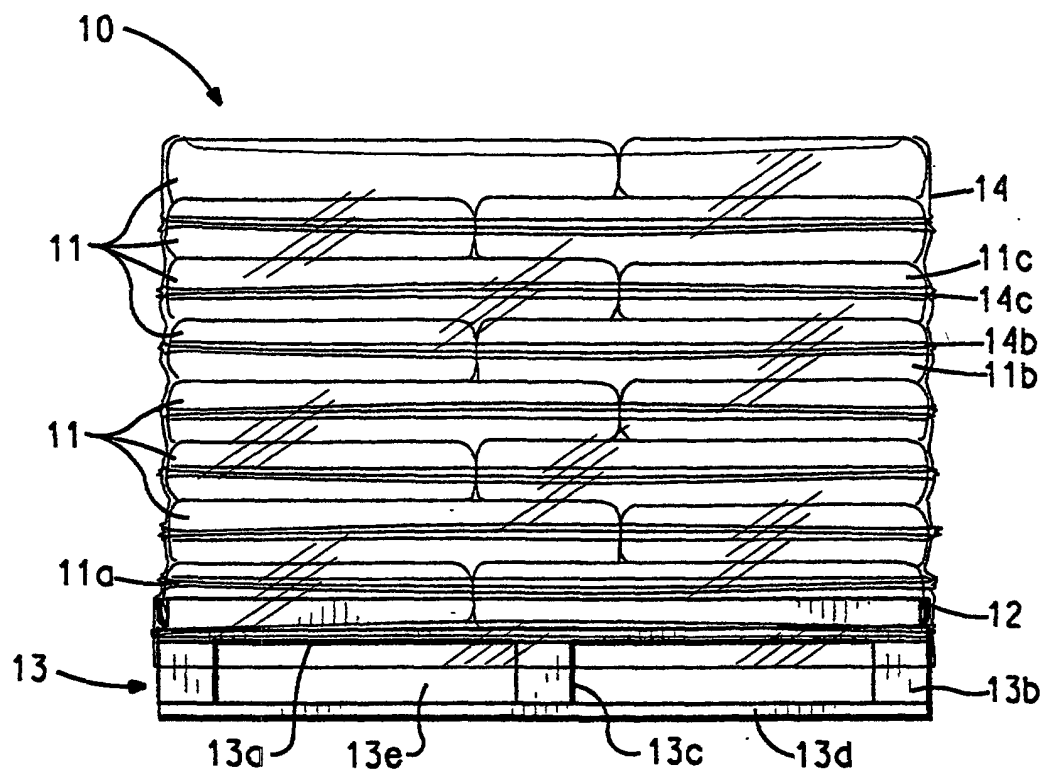
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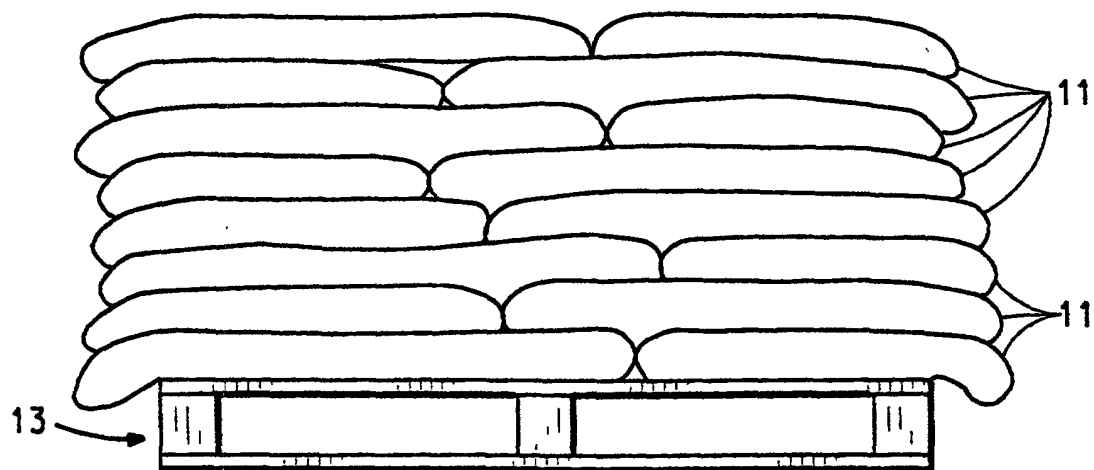
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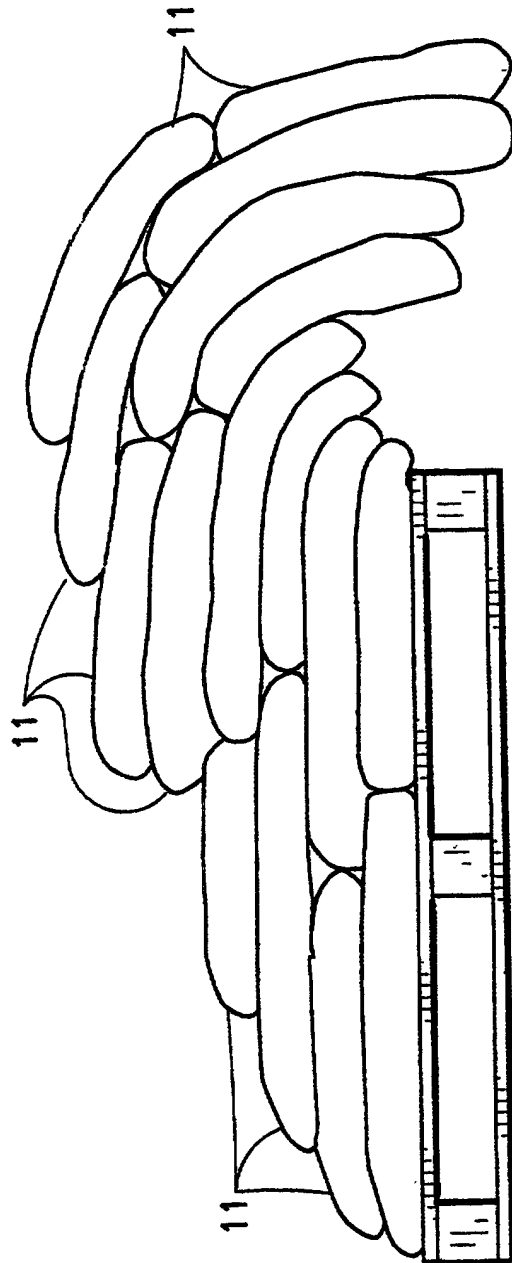
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**FIG. 1**



**FIG. 2**



**FIG. 3**